1. Determine whether the function below is 1-1.

$$f(x) = (3x - 21)^3$$

A. No, because there is a y-value that goes to 2 different x-values.

B. Yes, the function is 1-1.

C. No, because there is an x-value that goes to 2 different y-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.

---

2. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x+3} - 4$$

A. $f^{-1}(8) \in [-2, -1.42]$

B. $f^{-1}(8) \in [-2.82, -2.48]$

C. $f^{-1}(8) \in [5.43, 5.73]$

D. $f^{-1}(8) \in [-0.6, -0.48]$

E. $f^{-1}(8) \in [-2.56, -2.07]$

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3. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{4x - 25} \text{ and } g(x) = 3x^2 + 5$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [4.25, 9.25]$

B. The domain is all Real numbers except $x = a$, where $a \in [0.25, 7.25]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-8.8, -0.8]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-6.4, -1.4]$ and $b \in [3.33, 10.33]$

E. The domain is all Real numbers.

---

4. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^-1(-15)$ belongs to.

$$f(x) = 5x^2 - 3$$

A. $f^{-1}(-15) \in [2.29, 3.07]$

B. $f^{-1}(-15) \in [4.54, 5.58]$

C. $f^{-1}(-15) \in [0.83, 1.66]$

D. $f^{-1}(-15) \in [1.78, 1.96]$

E. The function is not invertible for all Real numbers.

---

5. Find the inverse of the function below. Then, evaluate the inverse at $x = 6$ and choose the interval that $f^-1(6)$ belongs to.

$$f(x) = \ln(x - 4) + 3$$

A. $f^{-1}(6) \in [9.39, 11.39]$

B. $f^{-1}(6) \in [22028.47, 22031.47]$

C. $f^{-1}(6) \in [11.09, 17.09]$

D. $f^{-1}(6) \in [23.09, 30.09]$

E. $f^{-1}(6) \in [8102.08, 8111.08]$

---

6. Determine whether the function below is 1-1.

$$f(x) = (5x - 31)^3$$

A. Yes, the function is 1-1.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.

---

7. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = 4x^2 - 5$$

A. $f^{-1}(10) \in [0.75, 1.29]$

B. $f^{-1}(10) \in [1.22, 2.45]$

C. $f^{-1}(10) \in [2.14, 4.12]$

D. $f^{-1}(10) \in [6.06, 7.1]$

E. The function is not invertible for all Real numbers.

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8. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{5x + 26} \text{ and } g(x) = 8x^2 + 6x$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-6.2, -3.2]$

B. The domain is all Real numbers except $x = a$, where $a \in [1.17, 9.17]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-1.8, 3.2]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [5.33, 6.33]$ and $b \in [-8.6, -5.6]$

E. The domain is all Real numbers.

---

9. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -x^3 - 3x^2 - 2x - 4 \text{ and } g(x) = x^3 + 4x^2 + 3x - 3$$

A. $(f \circ g)(-1) \in [2, 3]$

B. $(f \circ g)(-1) \in [-7, -4]$

C. $(f \circ g)(-1) \in [-20, -13]$

D. $(f \circ g)(-1) \in [-30, -17]$

E. It is not possible to compose the two functions.

---

10. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = -x^3 + 3x^2 + 4x - 1 \text{ and } g(x) = -x^3 + 2x^2 - x + 2$$

A. $(f \circ g)(1) \in [-83, -72]$

B. $(f \circ g)(1) \in [-90, -82]$

C. $(f \circ g)(1) \in [10, 18]$

D. $(f \circ g)(1) \in [-4, 6]$

E. It is not possible to compose the two functions.

---

11. Determine whether the function below is 1-1.

$$f(x) = -24x^2 + 4x + 580$$

A. No, because there is a y-value that goes to 2 different x-values.

B. No, because there is an x-value that goes to 2 different y-values.

C. Yes, the function is 1-1.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.

---

12. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = e^{x-4} - 2$$

A. $f^{-1}(7) \in [-1.91, -1.76]$

B. $f^{-1}(7) \in [-0.95, -0.87]$

C. $f^{-1}(7) \in [-0.02, 0.51]$

D. $f^{-1}(7) \in [-0.52, -0.32]$

E. $f^{-1}(7) \in [5.63, 6.64]$

---

13. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 2x^2 + 7x + 8 \text{ and } g(x) = \sqrt{4x - 17}$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [3.25, 7.25]$

B. The domain is all Real numbers except $x = a$, where $a \in [-5.75, -1.75]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-1.5, 9.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [3.6, 10.6]$ and $b \in [-0.6, 7.4]$

E. The domain is all Real numbers.

---

14. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^-1(-15)$ belongs to.

$$f(x) = \sqrt[3]{3x - 2}$$

A. $f^{-1}(-15) \in [1122.93, 1124.98]$

B. $f^{-1}(-15) \in [-1126.09, -1125.21]$

C. $f^{-1}(-15) \in [-1124.91, -1123.2]$

D. $f^{-1}(-15) \in [1124.54, 1127.79]$

E. The function is not invertible for all Real numbers.

---

15. Find the inverse of the function below. Then, evaluate the inverse at $x = 6$ and choose the interval that $f^-1(6)$ belongs to.

$$f(x) = e^{x+4} + 2$$

A. $f^{-1}(6) \in [4.15, 5.18]$

B. $f^{-1}(6) \in [3.83, 4.12]$

C. $f^{-1}(6) \in [5.31, 5.63]$

D. $f^{-1}(6) \in [2.13, 2.72]$

E. $f^{-1}(6) \in [-2.81, -2.57]$

---

16. Determine whether the function below is 1-1.

$$f(x) = (6x - 35)^3$$

A. Yes, the function is 1-1.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.

---

17. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -13$ and choose the interval that $f^-1(-13)$ belongs to.

$$f(x) = \sqrt[3]{3x - 4}$$

A. $f^{-1}(-13) \in [-731.4, -729]$

B. $f^{-1}(-13) \in [729.1, 731.8]$

C. $f^{-1}(-13) \in [-735.7, -733.5]$

D. $f^{-1}(-13) \in [731.6, 734.4]$

E. The function is not invertible for all Real numbers.

18. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{5x + 21} \text{ and } g(x) = 8x + 8$$

A. The domain is all Real numbers except $x = a$, where $a \in [-4.25, -2.25]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-10.2, -3.2]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-6.5, -2.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-7.75, -0.75]$ and $b \in [0.25, 8.25]$

E. The domain is all Real numbers.

19. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -x^3 - 2x^2 - 4x \text{ and } g(x) = x^3 - 1x^2 - 4x$$

A. $(f \circ g)(-1) \in [-6, 3]$

B. $(f \circ g)(-1) \in [3, 14]$

C. $(f \circ g)(-1) \in [-21, -16]$

D. $(f \circ g)(-1) \in [-30, -23]$

E. It is not possible to compose the two functions.

20. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -x^3 + 3x^2 + 4x - 3 \text{ and } g(x) = 3x^3 + 4x^2 - 2x - 4$$

A. $(f \circ g)(-1) \in [-39, -33]$

B. $(f \circ g)(-1) \in [4, 7]$

C. $(f \circ g)(-1) \in [-44, -41]$

D. $(f \circ g)(-1) \in [-3, 0]$

E. It is not possible to compose the two functions.

---

21. Determine whether the function below is 1-1.

$$f(x) = (5x - 20)^3$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because the range of the function is not $(-\infty, \infty)$.

C. Yes, the function is 1-1.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because there is a y-value that goes to 2 different x-values.

---

22. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x-4} - 4$$

A. $f^{-1}(8) \in [-1.52, -0.52]$

B. $f^{-1}(8) \in [6.48, 8.48]$

C. $f^{-1}(8) \in [-4.61, -1.61]$

D. $f^{-1}(8) \in [-1.52, -0.52]$

E. $f^{-1}(8) \in [-4.61, -1.61]$

---

23. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 7x^2 + 7x + 9 \text{ and } g(x) = 2x + 8$$

A. The domain is all Real numbers except $x = a$, where $a \in [-9.17, -0.17]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0.4, 7.4]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-0.33, 9.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-4.6, 7.4]$ and $b \in [-4.75, 0.25]$

E. The domain is all Real numbers.

---

24. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 11$ and choose the interval that $f^-1(11)$ belongs to.

$$f(x) = \sqrt[3]{3x - 2}$$

A. $f^{-1}(11) \in [-443.95, -442.28]$

B. $f^{-1}(11) \in [441.04, 444.2]$

C. $f^{-1}(11) \in [444.01, 444.69]$

D. $f^{-1}(11) \in [-445.64, -444.03]$

E. The function is not invertible for all Real numbers.

---

25. Find the inverse of the function below. Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = \ln(x - 5) + 3$$

A. $f^{-1}(10) \in [3269019.37, 3269022.37]$

B. $f^{-1}(10) \in [1084.63, 1094.63]$

C. $f^{-1}(10) \in [442415.39, 442424.39]$

D. $f^{-1}(10) \in [147.41, 155.41]$

E. $f^{-1}(10) \in [1098.63, 1103.63]$

---

26. Determine whether the function below is 1-1.

$$f(x) = (4x - 29)^3$$

A. Yes, the function is 1-1.

B. No, because there is a y-value that goes to 2 different x-values.

C. No, because the range of the function is not $(-\infty, \infty)$.

D. No, because the domain of the function is not $(-\infty, \infty)$.

E. No, because there is an x-value that goes to 2 different y-values.

---

27. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -10$ and choose the interval that $f^-1(-10)$ belongs to.

$$f(x) = 3x^2 - 4$$

A. $f^{-1}(-10) \in [4.25, 4.48]$

B. $f^{-1}(-10) \in [2.74, 3.91]$

C. $f^{-1}(-10) \in [2.01, 2.17]$

D. $f^{-1}(-10) \in [0.95, 2.12]$

E. The function is not invertible for all Real numbers.

---

28. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 8x + 9 \text{ and } g(x) = 2x + 9$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [3.25, 11.25]$

B. The domain is all Real numbers except $x = a$, where $a \in [-8.33, -3.33]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [1.83, 3.83]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-6.6, -0.6]$ and $b \in [4.2, 13.2]$

E. The domain is all Real numbers.

---

29. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 2x^3 - 1x^2 + 2x - 3 \text{ and } g(x) = x^3 + x^2 + 3x - 4$$

A. $(f \circ g)(1) \in [-0.8, 2]$

B. $(f \circ g)(1) \in [-7.6, -5.6]$

C. $(f \circ g)(1) \in [-4.3, -3.3]$

D. $(f \circ g)(1) \in [-11.7, -9.2]$

E. It is not possible to compose the two functions.

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30. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 2x^3 + 2x^2 - 2x \text{ and } g(x) = -2x^3 - 1x^2 + x + 1$$

A. $(f \circ g)(1) \in [-28, -25]$

B. $(f \circ g)(1) \in [2, 8]$

C. $(f \circ g)(1) \in [-10, 1]$

D. $(f \circ g)(1) \in [-19, -16]$

E. It is not possible to compose the two functions.
